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13. ABSTRACT *(Maximum 200 words)*

Funds from this grant have been used to provide Graduate Research Assistant (GRA) salary and tuition support for Jack A. Puleo (a US citizen) over much of the period July 1996 to August 1998. Mr. Puleo started graduate studies in the College of Oceanic and Atmospheric Science, Oregon State University in July 1996 and graduated with an MS Degree in Oceanography in summer 1998. Results from Mr. Puleo's MS thesis concerning "Swash zone sediment suspension and transport and the importance of bore-generated turbulence" have been written up and published in the Journal of Geophysical Research (Vol. 105, no. C7, pages 17,021-17,044, July 2000). After Mr. Puleo's graduation, funds from this grant were used to provide GRA salary and tuition support for Ms. Brandy T. Kuebel (a U.S. citizen) from Oct 1998 through May 1999. Ms. Kuebel is a PhD student who is currently pursuing thesis research on physical oceanographic circulation processes over the inner continental shelf.

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FINAL TECHNICAL REPORT

ONR GRANT N00014-96-1-0957 (ASSERT)

Principal Investigator: John S. Allen
Title: Nonlinear Shear Waves in the Surf Zone

Funds from this grant have been used to provide Graduate Research Assistant (GRA) salary and tuition support for Jack A. Puleo (a US citizen) over the period July 1996 to August 1998 (with the exception of 5 months in 1997 when Mr. Puleo was supported as a GRA by another grant). Mr. Puleo started graduate studies in the College of Oceanic and Atmospheric Science, Oregon State University in July 1996 and graduated with an MS Degree in Oceanography in summer 1998. The results of Mr. Puleo's MS thesis research have been written up and published in the *Journal of Geophysical Research* (Vol 105, No.C7, pages 17,021-17,044, July 15, 2000). The most informative description of this research is contained in the publication abstract which follows.

Swash zone sediment suspension and transport and the importance of bore-generated turbulence

by J. A. Puleo, R. A. Beach, R. A. Holman, and J. S. Allen

Abstract. A study of swash zone sediment transport was conducted at Gleneden Beach, Oregon during February 25-28, 1994. The data collected included suspended sediment concentration (SSC), sea surface elevation, and velocity (initially 4 and 8 cm above the bed) at three cross-shore locations within the swash zone spanning high tides. Ensemble averages of 6, 9, and 12 s duration swash events showed that the uprush suspension was high, concentrated in the leading edge, and nearly vertically uniform above the lower 1-2 cm of the water column. Shortly after the sensors were inundated by run-up, the sediment rapidly settled out of the water. During flow reversal the SSC was small but increased again in the backwash. Backwash vertical profiles were markedly different from uprush profiles with much of the suspension being confined to very near the bed where strong vertical gradients in SSC existed. These marked differences show that the backwash is not simply the reverse of the uprush, implying significant differences in the underlying fluid dynamics and sediment transport mechanisms. Backwash sediment suspension increased with flow duration. However, ensemble-averaged SSC profiles of varying duration showed that the backwash concentrations were not consistent at the same temporal phases, which suggests that water depth, in addition to flow duration, may be a controlling factor. Strong cross-shore gradients in SSC suggest that bore-derived turbulence may affect local sediment transport. Specifically, our data show this bore-generated turbulence (turbulent kinetic energy) directly influences local sediment suspension, hence, standard bed shear (Bagnold-type) sediment transport models may no longer be valid in the vicinity of the bore. In the vicinity of the bore a higher correlation between bore-generated turbulence and suspended sediment transport was found than between a Bagnold-type formulation and suspended sediment transport.

After Mr. Puleo's graduation, funds from this grant were used to provide GRA salary and tuition support for Ms. Brandy T. Kuebel (a U.S. citizen) from Oct 1998 through May 1959. Ms. Kuebel started graduate studies as a PhD student in the College of Oceanic and Atmospheric Sciences, Oregon State University in October 1998. She is currently pursuing thesis research on physical oceanographic circulation processes over the inner shelf.

LIST OF PUBLICATIONS

Puleo, J. A, R. A. Beach, R. A. Holman, and J. S. Allen, 2000: Swash zone sediment suspension and transport and the importance of bore-generated turbulence, *J. Geophys. Res.*, 105, 17,021-17,044.